Validation of *Mannheimia haemolytica* and *Pasteurella multocida* Challenge Models in Calves using Recent Field Isolates

Cliff Ramage¹, David Reddick¹, John Murray¹

1 Moredun Scientific, Pentland Science Park, Bush Loan, Penicuik, Scotland, UK.

dreddick@moredun-scientific.com

Introduction

*Mannheimia haemolytica* is a causative agent of pneumonia pasteurellosis, a disease of newly weaned calves. Calves are particularly susceptible during transport to market or when held at high stocking density, hence the disease is often referred to as ‘Shipping Fever’ or ‘Crowding Disease’. *Pasteurella multocida* is an important veterinary and opportunistic human pathogen with a diverse and complex structure, host range and virulence, that causes pneumatic and systemic disease in livestock as well as fowl cholera in chickens and turkeys, atrophic rhinitis in pigs, and dog and cat bite infections in humans. This study optimised challenge models for experimental infection of calves with either *M. haemolytica* or *P. multocida* based on Moredun Scientific’s existing models¹,²,³ but using more recent UK field isolates of the organisms to produce mild to moderate clinical signs of disease.

Materials and Methods

Twenty calves at approximately six weeks of age were allocated to two groups of seven (*M. haemolytica* and *P. multocida*) and one group of six (saline control). Challenge material consisted of log-phase cultures diluted in phosphate buffered saline and administered as 300ml volumes via the intra-tracheal route using an endoscope. Calves were clinically observed (rectal temperature, demeanour, respiration, coughing and nasal discharge were assessed) for a period of four days post-challenge and then necropsies performed with lungs assessed for lesion formation and bacterial recovery from lung tissue.

Results

Both models resulted in clear clinical signs with pyrexia, increased respiratory effort and rate, mild to moderate depression, sporadic coughing and occasional nasal discharge. At necropsy, the mean percentage of lung with lesion was 25.13% in the *M. haemolytica* animals, 20.35% in the *P. multocida* group and 6.71% in the controls. The relevant challenge isolates were recovered from lung tissue samples from all *M. haemolytica* and *P. multocida* challenged animals.

Conclusion

These models will provide stable platforms for prophylactic, metaphylactic and therapeutic efficacy testing using recent field isolates for the control of bovine respiratory disease.

References


2. Forbes, AB, Ramage, C, Sales, J, Baggott, D, Donachie, W; 2011; Determination of the duration of antibacterial efficacy following administration of gamithromycin using a bovine *Mannheimia haemolytica* challenge model; Antimicrobial Agents and Chemotherapy 55 (2); 831-835.